QA UNIT FACT SHEET 11/96

X-RAY FLUORESCENCE
"A QUALITY PERSPECTIVE OF METALS ANALYSIS IN THE FIELD"

WHY: This standard operating procedure (SOP), Region I, EPA-New England Standard Operating Procedure for Elemental Analysis Using the X-MET 920 Field X-Ray Fluorescence Analyzer, was written by the QA Unit Staff to promote and provide a framework for regulatory acceptance of a technology that has innovative applications in environmental testing. On-site field analysis technologies, such as X-ray fluorescence (XRF), can offer project managers "real-time" results at a fraction of the cost and time required for conventional laboratory analyses.

Although this SOP is directed at the field unit owned and operated by Region I, EPA-New England, it contains generic analytical and quality assurance (QA) guidance that can be applied to any field XRF analyzer. In addition, the intent of this document is to provide the project planner with the guidance and information required to develop a comprehensive approach to using field XRF for environmental applications.

WHAT: XRF is a non-destructive analytical technique used to determine the elemental composition of a sample. Synonymous with metals analysis, a field XRF analyzer can determine the concentration of several desired metals in as little as 30 seconds. This ability to collect considerable site data in a relatively short amount of time, can greatly assist project managers to characterize site contamination and monitor site clean-up.

This SOP is directed at maximizing the potential of XRF technology for use in environmental site investigation and cleanup activities. It provides a basic understanding of XRF operation and guides the project planner/chemist in utilizing field XRF to achieve the data quality objectives (DQOs) of a project. In addition, the SOP discusses the critical elements of an environmental quality assurance/quality control program that are necessary to assure quality data for its intended purpose. This document addresses the following concepts and processes:

- Project planning for environmental XRF,
- XRF theory and field unit application,
- Key Quality Control elements necessary to ensure quality XRF analyses,
- Laboratory confirmation analysis as part of the Quality Assurance Program, and
- Comparing and using project data generated for environmental decisions.

WHO: This SOP is intended for use by numerous stakeholders, including EPA and its contractors, States, Tribes, other Federal Agencies, PRPs, industry, and the public. This document, in combination with an XRF user's manual, can help project planners, project chemists, and field samplers to plan successful XRF projects that produce quality metals data for use in critical project decisions.